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To cite this article: Lauren Brown, Laszlo Horvath & Daniel Stevens (2021) Moonshots or a cautious take-off? How the Big Five leadership traits predict Covid-19 policy response, Journal of Elections, Public Opinion and Parties, 31:sup1, 335-347, DOI: [10.1080/17457289.2021.1924739](https://doi.org/10.1080/17457289.2021.1924739)

To link to this article: <https://doi.org/10.1080/17457289.2021.1924739>



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Published online: 15 Jun 2021.



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Moonshots or a cautious take-off? How the Big Five leadership traits predict Covid-19 policy response

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ABSTRACT


The Covid-19 crisis has been truly worldwide and has unfolded almost simultaneously across the globe. In order to control its spread and alleviate its impact governments have been faced with a range of policy options in terms of containment and closure, ramping up healthcare, and mitigating its economic effects. In this paper, we explore the stringency as well as the speed of policy response as a function of leaders' personality traits, accounting for party-political orientation. To do this, we construct a text corpus composed of 26 country leaders' rhetoric on Covid-19 collected from 10 days before the first recorded death in their respective countries until 90 days after, and use a pre-trained machine classifier to generate the Big Five personality traits for each leader. We find two general patterns: (1) one around neuroticism, a trait associated with negative stress response, which is associated with leniency in containment and health policy measures; and (2) some evidence that conscientiousness, a trait associated with risk aversion, is associated with quicker policy response. We conclude by suggesting analysis on the sub-national level in order to increase test power, and more work on validation linking our estimates of Big Five to expert ratings of personality.

ARTICLE HISTORY Received 27 September 2020; Accepted 17 March 2021

Introduction

The Covid-19 pandemic has presented leaders with a crisis comparable to war: it has demanded decision-making under time pressure with life or death effects as well as potentially devastating economic outcomes. A long tradition in political science and political psychology links who we elect as leaders with the policies, behaviour, and ultimate success of such decisions, rejecting the notion that those outcomes are purely a function of structural or environmental influences and constraints (e.g. Barber 1992; Brummer 2016; Hermann 1980; Greenstein 1967). Despite its venerability, this research

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 Supplemental data for this article can be accessed <https://doi.org/10.1080/17457289.2021.1924739>

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is often criticized for several reasons. These include limited generalizability due to the tendency to focus on one or two leader cases; the difficulty of adequately accounting for varying national contexts, time, or the relative contributions of other contextual factors such as leaders' ideology or party; and imprecise measures of outcomes that are vulnerable to confirmation bias (see Houghton 2014, Chapters 7 and 8).

The Covid-19 pandemic has three features that offer unique potential to examine the psychology and effects of leadership while avoiding a number of these limitations. First, unlike previous crises the impact of Covid-19 has been truly worldwide, providing greater opportunity for comparative research. Second, leaders have generally felt compelled to talk about the crisis regularly, providing a large amount of rhetoric from different leaders on the same issue at the same time. Third, the Covid-19 pandemic offers objective criteria such as when lockdowns were introduced and their stringency in real-time, rather than relying on more subjective criteria such as expert ratings of historic cases.

This allows us to examine leaders' decision-making more rigorously than research heretofore in answer to two questions: to what extent is (1) the *stringency* and (2) the *speed* of a country's policy responses to a crisis associated with the personality traits of its leader? Using the "Big Five" personality traits of openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism or emotional stability, we expect prominent influences of two traits in particular. Neuroticism's associations with indecisiveness may mean that leaders higher in this trait are prone to more lax and less speedy policy responses to the unfolding Covid-19 pandemic, while conscientiousness' associations with risk aversion should, by contrast, be associated with stricter and more timely responses.

Leadership and personality

A textbook definition of personality traits to which we subscribe is, "individual characteristics that predispose people to act in particular ways, but which also interact with environmental factors (e.g. actions of others, political context) to shape the behaviour and decisions of members of political elites" (Caprara and Silvester 2018, 467–468). High stakes and time pressure, i.e. new and uncertain situations, affect the ways in which decisions are made. Even if the environmental constraints on policy responses may limit influence, previous research cited above has suggested systematic effects of leaders' personalities. This research generally derives personality traits using "at-a-distance" approaches, in which traits are inferred from leaders' rhetoric. But which personality traits are salient?

The "Big Five" personality traits that we examine here have, according to Gallagher and Allen (2014, 3), "become the dominant paradigm of personality

psychology.” Despite the Big Five model having this advantage of broad acceptance – unlike alternatives such as Leadership Trait Analysis (LTA), it is used in other disciplines – in political science it has so far been used mainly in studies of mass rather than elite psychology (though see Gallagher and Allen 2014; Ramey et al. 2019). Nevertheless, some previous research has linked Big Five traits to political orientation and behaviour. For example, openness to experience is predictive of ideological liberalism, whereas conscientiousness tends to be predictive of ideological conservatism (Mondak 2010, 51). Most pertinently for the purposes of this paper, neuroticism, which captures emotions such as anger, anxiety, and hostility, i.e. affect, as well as impulsiveness and vulnerability, is the strongest predictor of negative stress reactions (Dyson and t’Hart 2013). The most neurotic decision-makers perceive situations as stressful, perceive stress more intensely, and cope less well (Suls 2001). Neuroticism is also associated with greater risk aversion and indecisiveness (Germeijs and Verschueren 2011; Nicholson 2005).

Alternative measures of personality that have been used in political science include Hermann’s Leadership Trait Analysis (LTA, Hermann 1980) and “operational code” approaches (e.g. Schafer and Walker 2006). Operational code approaches derive internal belief systems from leaders’ use of particular verbs in particular contexts. For example, Schafer and Walker (2006) argue that differences in Bill Clinton and Tony Blair’s belief systems as revealed by speeches in their first terms were consistent with different approaches to the way they managed conflict with nondemocracies. However, Houghton (2014, 125) contends that the theoretical foundations of operational code analysis “such as cognitive consistency theory ... have fallen somewhat out of vogue” (although he describes some of the more recent theorizings as, “incorporating insights from cognitive and affective theories.”)

The more widely used LTA suggests that in addition to the content of what the leader says, the manner in which it is expressed is indicative of how he/she thinks about the world in terms of seven traits. However, LTA suffers from a number of weaknesses: first, unlike the Big Five personality traits its application is limited to political leaders, precluding comparisons to mass personality or to leaders in other decision-making domains; second, LTA is largely cognitive in focus, ignoring more affective dimensions of personality; and third, as we outline in more detail below, there are weaknesses in the accuracy of the dictionary-based methods on which LTA relies relatively to machine learning models.

Covid-19 and leadership

At the time of writing, there have been two areas of research of relevance to the potential influence of leadership traits. The first looks at the impact of the Covid-19 crisis on perceptions of incumbent governments, indicating that the initial

period of the pandemic prompted rally-round-the-flag effects for incumbents and thus increased support (e.g. Bol et al. [Forthcoming](#); Giommoni and Loumeau [2020](#); Merkley et al. [2020](#)). This suggests that while the context of the unfolding pandemic was clearly a crisis in terms of danger to lives and potential long-term effects on government support, the short-term political effects would not appear to have exacerbated the sense of crisis.

The second area of research has examined the differences in policies and outcomes pertaining to Covid-19 for male and female leaders. Here findings have been more mixed. Some studies suggest no differences in outcomes between male and female leaders once appropriate control variables are included such as states' capacity in health care (Bosancianu et al. [2020](#); Piscopo [Forthcoming](#)). Others also indicate no overall differences but some systematic variation in specific policy responses (Shay [Forthcoming](#)). On the other hand, Garikipati and Kambhampati ([2020](#)) suggest that countries with female leaders have fared systematically better in terms of a number of deaths and attribute this to different policy responses such as timing and stringency of lockdowns due to gendered differences in risk aversion.

Thus, no research to our knowledge has considered the influence of leaders' personality on policy responses to Covid-19 as opposed to gender, despite the unique promise the pandemic offers to understand the role of personality in a single domain in which the environmental constraints on leaders were similar. Our focus here is on traits of leaders in general rather than on gender differences, but we consider in Online Appendix A whether male and female leaders exhibit systematic variation in traits; we find few differences.

Previous research on the Big Five suggests that given neuroticism's links with negative stress response and indecisiveness, we may expect this trait to be associated with delayed and perhaps more lenient policy responses in particular (Germeijs and Verschueren [2011](#); Nicholson [2005](#); Suls [2001](#)). By contrast, conscientiousness' links with risk aversion and social conservatism (Mondak [2010](#)) may predict an early and more stringent response. These imply a lesser role for openness, extraversion and agreeableness.

Research design

In order to answer our questions on the speed and stringency of policy responses, we use the "at-a-distance" method of inferring leaders' personality traits from their rhetoric, with text as data. This approach has become one of the most widely used techniques for measuring personality (Winter [2013](#)).

*Sample and Corpus*¹

The Covid-19 pandemic provides a unique context in that leaders around the world have been compelled to address and respond at the same time in

terms of rhetoric and policies. In May 2020, we selected 26 leaders in “free” or “partly free” countries according to Freedom House for analysis based on a mixture of varying rates of mortality, male and female leaders, parties in government, and regional spread. These countries are Australia, Austria, Canada, Chile, Colombia, Denmark, France, Germany, Greece, Hungary, India, Ireland, Italy, Japan, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Peru, Scotland, South Africa, South Korea, Spain, UK, and the USA. We captured rhetoric from their leaders that referred to “Covid-19” or other similar keywords from press conferences, speeches and statements, interviews, forums with the public, or parliamentary questions.² Rather than draw on a single-time frame for all leaders like Garikipati and Kambhampati (2020), which ignores the virus being at different stages in different countries, we standardize the context by focusing on a period starting 10 days before the first death officially attributed to the virus in each country and ending 90 days after the first death (in practice, all press conferences or interviews were about Covid-19 over this period). This provided us with more than two million words from leaders in these countries.

Estimating personality

Generating personality traits from text often means dictionary-based analysis in which the researcher takes a textual corpus of speeches and runs them through an inventory of terms associated with a particular personality trait. For example, a dictionary specifically tailored to Leadership Trait Analysis (LTA) is Profiler Plus (Levine and Young 2014). While this approach has been used successfully in previous work, the principle underlying the method has its disadvantages. For example, a source of measurement error is when keywords associated with a particular trait are mentioned but negated or used in a different context unrelated to the trait. Another problem is if synonyms and expressions with a meaning similar to a keyword are missing from a dictionary that is not exhaustive enough, such as “I am very happy” for positive affect vs. “I am over the moon.” We thus turn to pre-trained personality classifiers using computational approaches to the text.³

There are a variety of models available for estimating Big Five traits as commercial API services. IBM Watson’s Personality Insights model is trained on text written by 600 authors who also provided responses to a standard 50-item Big Five questionnaire derived from the International Personality Item Pool (IBM

¹The corpus of material described in this section is available in Brown, Horvath, and Stevens (2021).

²There is some debate about whether scripted speech is as valid as spontaneous speech in discerning personality. Schafer and Walker (2006) argue for the validity of scripted speech because speechwriters mimic the personality of their leaders and leaders edit the language of speechwriters. We use a mixture of spontaneous and scripted speeches.

³For reference and comparability with previous research, we also generate dictionary-based LTA traits and present the analysis in Appendix B.

Cloud Docs 2020). The API takes an input text, calculates the high dimensional vector representation of each word and phrase – attempting to capture the meaning of the words as commonly used in context and addressing some of the issues raised above – and predicts each trait using a set of rules learned on the training corpus. IBM reports the accuracy of results as the average correlation across the psychometric measures and text-based predictions: 0.31 (2020). Although modest, this correlation is difficult to compare with other approaches as standards of validation have changed: Hermann reports higher accuracy for the LTA scheme but her figures are based on external confirmation using explicit trait scales, for example, “How would you rate leader X on cognitive complexity?” rather than on psychometric testing of leaders. Moreover, on other domains such as sentiment, it has been consistently shown that the simplest machine learning model outperforms dictionary-based methods (Reagan et al. 2017; Rice and Zorn 2019).

Using our corpus of Covid rhetoric as input text, we generated the Big Five personality traits for each of the 26 leaders. To aid interpretability, instead of raw scores we report percentile scores that compare each leader’s personality trait to that trait’s distribution in the general population.⁴ We show three representative examples in Figure 1 below: for Justin Trudeau (Canada), Nicola Sturgeon (Scotland), and Angela Merkel (Germany). Figure 1 shows that leaders are consistently higher on the traits of openness and conscientiousness ($M = 0.90\text{--}0.96$, $SD = 0.03\text{--}0.04$) than the reference population. There is more variation, however, for the other three traits of extraversion, neuroticism, and agreeableness ($M = 0.20\text{--}0.26$, $SD = 0.12\text{--}0.15$). We show the full list of leader profiles in Online Appendix A, as well as associations across traits, gender, and partizanship.

Policy response variables

For the *Stringency of Covid-19 policies* we use the open-source Oxford Covid-19 Government Response Tracker (Hale et al. 2020), which provides ordinal scales across 15 indicators relating to containment and closure (of schools, work, gatherings, public events, public transport, and Stay at Home requirements), economic policies (income support, debt relief, fiscal measures, and international support), and health system policies (information campaigns, testing, contact tracing, emergency investment in healthcare and vaccines).⁵ The unit of analysis in this data is sub-region-day. We first collapsed each policy indicator to the country level within each day and then across 101

⁴Inferred from the training data and calculated by the API; thus the population in question is their sampled population with social media texts. We accept this as a benchmark for whether a leader’s trait is high or low.

⁵Investment figures are measured in US dollars, standardized over total country GDP for relative measures of investment.



Figure 1. Examples of estimated personality profiles. Note: Big Five personality traits (percentile scores) generated with IBM Watson’s Personality Insights API, using speeches of 26 leaders gathered during the first 101 days of the coronavirus pandemic, counted from 10 days before the first recorded death in each country (day 0) and tracked for 90 days after.

days, for each country and each policy area, taking the most stringent policy available (highest value on the ordinal scale or highest relative investment figure) in both steps.⁶ For the *Speed of policy implementation*, we calculated the number of days in each country between the first recorded death and the first non-zero value on the 15 policy measures.

Finally, to be able to fit small linear models we collapsed both of these measures across all policy areas into a single index: *median stringency* across closure and containment indicators (a weighted index calculated by the data provider), and *Median days to first policy* across all 15 policies. In the linear models, we control for the country leaders’ party-political orientation, which could be conflated with their personality traits, by taking their respective parties’ most recent Global Party Survey left-right placement (Norris 2020).

Results

As shown in detail in Online Appendix A, we observe relatively small variation in leadership traits across the sampled leaders,⁷ with the biggest outlier being US President Donald Trump on agreeableness. We report results using all leaders but in Online Appendix C we rerun the analyses dropping Trump’s profile from the sample. While this affects a few individual correlation coefficients, the observations we report in the main text including the regression coefficients remain robust.

Stringency of Covid-19 policies

In Figure 2 below, we show pairwise correlations across the 15 policy areas and each of the Big Five traits. A positive correlation implies stricter policy, whereas

⁶We found similar results using the median value.

⁷This is in keeping with LTA, whose “normed” measure of elite leadership traits shows small variation on the 0–1 scale (e.g., Brummer 2016).

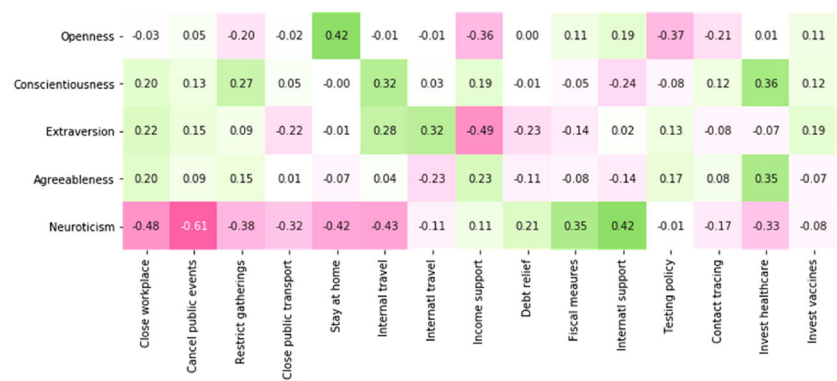


Figure 2. Correlation between personality trait and policy stringency.

a negative correlation implies more lenient policy as the trait score increases. Figure 2 shows that while some policy areas correlate with openness, conscientiousness, extraversion, and agreeableness, there is a more general pattern for *neuroticism* that belies policy as uninfluenced by leaders' personalities. Neuroticism has a consistently negative correlation of moderate to the high magnitude with the first set of policies relating to closure, a positive correlation of varying magnitude with economic interventions including fiscal measures, and a weak negative correlation with most health policy measures. We also note that the strongest relationship across the board is between *neuroticism* and leniency in cancelling public events. These results indicate, in line with previous research discussed above, that neuroticism has the strongest relationship with risk aversion and indecisiveness and that it hinders and slows policy response (risk aversion could conceivably have opposite effects, leading to more and more rapid policy responses but that is not what we observe in the context of Covid-19).

To test for the presence of a more general association between stringency and personality, we fitted simple linear models controlling for the governing parties' ideology as a measure of overall policy orientation (shown to predict stringency by Sebhatu et al. 2020), using median stringency as the outcome variable. Due to the small sample size, we are unable to increase the number of parameter estimates to get a fully specified model and continue to treat our analysis as exploratory.^{8,9} As shown in Table 1 below, we find support

⁸We did, however, re-estimate our models with gender as a control variable. The effect of neuroticism decreases slightly to -6.76 , while the gender coefficient is 4.16 (not significant) implying men implemented slightly more stringent policies.

⁹Our models are otherwise in no clear violation of linearity, normality, and homoscedasticity. However, Sebhatu et al. (2020) show evidence of cross-border diffusion of policy that suggest our observations may not be fully independent. Our estimates are also influenced by outliers but when removing them *neuroticism* remains a significant predictor of stringency (see Online Appendix C).

for neuroticism's negative association with policy stringency but no clear support regarding the other dimensions.

Speed of Covid-19 policy response

Drawing on the literature linking personality to outcomes including decisiveness and risk-taking, we next ask whether leader personality can also explain the speed with which Covid-19 policies were enacted. [Figure 3](#) shows pairwise correlations in which negative values imply quicker response and positive values imply slower response – we reversed the colour scale accordingly. There is no clear pattern linking a single trait to a general policy area; instead, we find considerable variation across specific policies. It appears that *openness* among leaders led to slower responses of varying magnitude, with most reluctance to implement closures and provide income support. On balance, *conscientiousness* led to quicker income protection but the relationships are smaller overall. The other traits have more of a mixed record on speed of response but it is noteworthy that *agreeableness* led to the quickest response on income support.

We next repeat the model from [Table 1](#) but for speed of policy response, operationalized as the median number of days in each country before a policy response. In these estimates, we find no clear evidence of an individual trait predicting response speed, and the magnitude of personality effects is consistently smaller than that of a leader's party ideology ([Table 2](#)).¹⁰

Discussion

The findings of this paper offer a number of contributions. First, we add to the literature on personality in two ways: we show that *who* we elect, even in a context that has been relatively consistent across countries, can affect policy response independent of constraints such as party; and that alternative measures of personality such as LTA may miss part of this picture by not capturing the affective influences of personality. Second, we draw on more recent advances in Natural Language Processing by using a personality classifier rather than a Lexicon-based approach. Third, we demonstrate the potential of data linkage across different data sources to understand governments' crisis responses, matching policy track records and fiscal measures with text as data.

¹⁰As in footnotes 8 and 9, we found no gender mediation and these models did not violate regression assumptions. However, removal of several influential outliers did impact statistical significance for *Conscientiousness*, which emerged as a significant predictor of faster policy response.

Table 1. Leader personality and party ideology effects on stringency.

DV: Median stringency index					
Intercept	57.30*** (3.54)	57.30*** (3.42)	57.30*** (3.42)	57.30*** (3.47)	57.30*** (3.24)
Left-right placement	-0.73 (3.61)	-0.85 (3.49)	0.25 (3.56)	-1.18 (3.57)	-3.17 (3.49)
Openness	0.12 (3.61)				
Conscientiousness		4.59 (3.49)			
Extraversion			4.72 (3.56)		
Agreeableness				3.51 (3.57)	
Neuroticism					-7.45* (3.49)
R ²	0.00	0.07	0.07	0.04	0.17
Adj. R ²	-0.08	-0.01	-0.01	-0.04	0.09
Num. obs.	26	26	26	26	26
RMSE	18.07	17.42	17.41	17.70	16.51

* $p < 0.05$ Predictors mean-centered and standardized for comparability. *** $p < 0.01$.

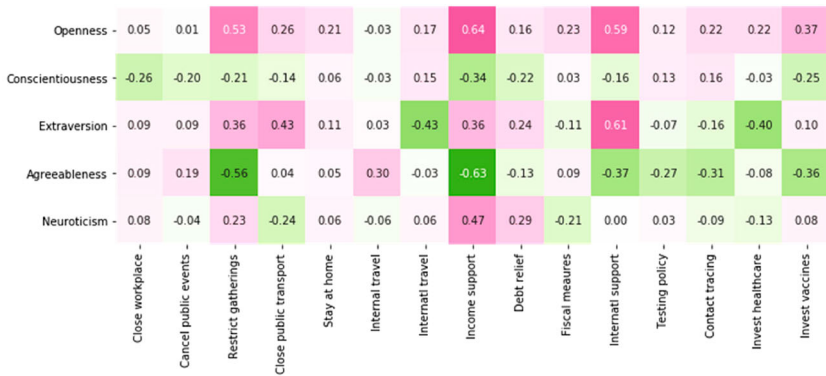


Figure 3. Correlation between personality trait and speed of policy response.

We acknowledge that our analysis is limited by a small sample size; we thus treat our method as generating further hypotheses for a more systematic, perhaps sub-national level of analysis (e.g. US governors). We are also conscious of the need for more validation work on the Big Five personality traits as extracted from text with expert ratings of leadership personality, as well as an investigation of personality traits over time. In addition, future research should look at the impact of combinations of traits, e.g. low conscientiousness coupled with high neuroticism, as well as more deeply at any links between gender of leaders and personality traits, which would also demand a larger sample size. Finally, future work should explore the generalizability of our findings to additional policy actions such as vaccination programmes.

Table 2. Leader personality and party ideology effects on speed of policy response.

DV: Median days to policy response					
Intercept	1.50 (1.64)	1.50 (1.64)	1.50 (1.64)	1.50 (1.64)	1.50 (1.64)
Left-right placement	1.88 (1.67)	1.89 (1.67)	2.02 (1.71)	1.78 (1.69)	2.10 (1.77)
Openness	1.04 (1.67)				
Conscientiousness		-1.00 (1.67)			
Extraversion			0.76 (1.71)		
Agreeableness				0.67 (1.69)	
Neuroticism					0.73 (1.77)
R^2	0.07	0.07	0.06	0.06	0.06
Adj. R^2	-0.01	-0.02	-0.02	-0.02	-0.02
Num. obs.	26	26	26	26	26
RMSE	8.34	8.34	8.37	8.38	8.38

* $p < 0.05$ Predictors mean-centered and standardized for comparability.

Large-scale policy interventions such as closures, testing, and contact tracing have been introduced globally to mitigate the effects of the coronavirus pandemic. Recent studies have shown that introducing a combination of measures, rather than isolated interventions, is an effective way to slow the spread of the virus (Davies et al. 2020); and that timing is crucial (Sebhatu et al. 2020). Our paper offers a first investigation of whether leadership traits, measured across the Big Five personality traits, matter in terms of the stringency and speed of these decisions. We show preliminary evidence that *neuroticism* is associated with more lenient measures on closure specifically, and that *conscientiousness* may have led to somewhat quicker protective measures (but not more stringent ones as we expected). We find mixed effects regarding the other traits. Thus, even though Covid-19 has presented leaders with essentially identical repertoires of potential policy responses, their stringency and speed of response has been influenced by more than factors such as party.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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